Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P036414/WO/1	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP2003/001888	International filing date (*day/month/year*) 25 February 2003 (25.02.2003)	Priority date (*day/month/year*) 02 March 2002 (02.03.2002)
International Patent Classification (IPC) or national classification and IPC H01M 8/04, C23F 13/02		
Applicant MTU CFC SOLUTIONS GMBH		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 11 September 2003 (11.09.2003)	Date of completion of this report 17 June 2004 (17.06.2004)
Name and mailing address of the IPEA/EP Facsimile No.	Authorized officer Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/EP2003/001888

I. Basis of the report

1. With regard to the **elements** of the international application:*

☒ the international application as originally filed

☒ the description:

pages 1-7, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

☒ the claims:

pages 1-9, as originally filed

pages _____, as amended (together with any statement under Article 19

pages _____, filed with the demand

pages _____, filed with the letter of _____

☒ the drawings:

pages 1/1, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

☐ the sequence listing part of the description:

pages _____, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIM[redacted]RY EXAMINATION REPORT

International application No.
PCT/[redacted]03/01888

V. **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-9	YES
	Claims		NO
Inventive step (IS)	Claims	1-9	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-9	YES
	Claims		NO

2. Citations and explanations

Reference is made to the following documents and the passages therein cited in the international search report:

D1: PATENT ABSTRACTS OF JAPAN vol. 016, no. 146 (E-1188), 10 April 1992 (1992-04-10) & JP 04 004570 A (HITACHI LTD), 9 January 1992 (1992-01-09), cited in the application

D2: DE 42 36 441 A (SIEMENS AG) 5 May 1994 (1994-05-05)

D3: EP-A-1 263 071 (DELPHI TECH INC) 4 December 2002 (2002-12-04)

D4: WO 02 19446 A (GLOBAL THERMOELECTRIC INC) 7 March 2002 (2002-03-07)

D1 and D2 both disclose high temperature fuel cells, hydrogen (plus water vapour in D2) being fed to the anodes in standby mode (D1) or before normal operation (D2), ***inter alia* to avoid damage from oxidation at the anodes** (= "inertization"). Although it is correct that neither D1 nor D2 discloses an external voltage for generating a reductive atmosphere at the anodes by electrolysis, this is superfluous since an atmosphere containing reductive hydrogen is already present, without electrolysis having to be carried out. In this respect, the hydrogen is

supplied by the reformer (5 in D1). The disclosures in D1 and D2 offer the same advantage as the present application insofar as a standby gas does not have to be stocked up especially, but the external voltage source and the associated outlay in terms of apparatus, as per the present invention, are unnecessary. However, D1 also seems to involve its own additional degree of complexity in terms of operations, since the reformer does not appear to be of the conventional type but is an additional one ("aux. reformer 5"), which would have to be suitable for standby mode in particular.

With respect to the prior art, the present invention offers the essential advantage of an additional protective function in that any oxygen molecules present - and their presence can never be completely ruled out - react as a result of the electrolysis voltage to form oxygen ions O^{2-} which therefore are no longer able to oxidize, thereby increasing the anodes' resistance to oxidation.

Since the invention offers an alternative method and alternative device which prevent the anodes from oxidizing, with a high degree of reliability, the inventive step requirement of PCT Article 33 is also met.

According to the teachings of the intermediate documents D3 and D4, a reductive voltage and atmosphere are applied to the fuel cell anodes during standby mode, without the need for water vapour. This may be relevant in the regional phase.